Project No.
5969.3.001.01

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Mr. Salifu Yakubu
Department of Planning, Building, and Code Enforcement
801 N. First Street, Room 400
San Jose, CA 95110

Subject: Coyote Valley Specific Plan Area
San Jose, California

TECHNICAL MEMORANDUM – COMPOSITE CORE PLAN

Reference: ENGEO Inc.; Preliminary Geotechnical Evaluation, Coyote Valley Specific Plan Area, San Jose, California; Revised June 14, 2004; Project No. 5969.3.001.01.

Dear Mr. Yakubu:

As requested, this technical memorandum has been prepared to present geotechnical and geologic input regarding the armature elements of the Coyote Valley Specific Plan (CVSP) Composite Core Plan prepared by Dahlin Group/KenKay. The Campus Industrial and Urban Reserve form the focus development area of the CVSP – Composite Core Plan (Core Plan), totaling approximately 3,327 acres.

Based upon information provided by the CSVP Land Planning team, the four armature elements of the Coyote Valley Specific Plan - Composite Core Plan include:

(i) A spoke transit system.

(ii) Restoration of Fisher Creek to its natural flow line and a focal lake.

(iii) A Parkway that incorporates Bailey Avenue.

(iv) A density distribution that emphasized intensification of workplace areas with structured parking; and moderate incorporation of residential hi-rise and mid-rise to allow the maximum opportunity for other family housing typologies such as town home and single family detached.

EXECUTIVE SUMMARY

The geotechnical review for the Composite Core Plan focused upon four armature elements and associated impacts to feasibility, cost versus value, and ability to develop if one of the four elements was varied while the other three elements remained constant.

The constant elements for our evaluation included a spoke transit system; a parkway that incorporates Bailey Avenue; and a density distribution that emphasized intensification of workplace areas with structured parking, and moderate incorporation of residential hi-rise and mid-rise to allow the maximum opportunity for other family housing typologies such as town home and single family detached. The variable armature element is Element (ii), restoration of Fisher Creek to its natural flow line and a focal lake, which was modified in the following three ways:

- An environmental footprint that avoids Fisher Creek and does not propose a lake.
- An environmental footprint that incorporates multiple small lakes and enhances Fisher Creek.
- Restoration of Fisher Creek to its natural flow line and a focal lake.

The geotechnical/geologic aspects of the Composite Core Plan with respect to feasibility, cost versus value, and ability to develop, however, are not highly sensitive or variable as Element (ii) varies. The geologic conditions in the valley floor area are generally alluvial deposits that range in current density, based upon their age of deposition. When subjected to prolonged ponding or flooding, some alluvial deposits, as with most soils, will experience reduced strength characteristics and will swell and shrink (densify) associated with seasonal wetting and drying. As a result, structures founded on shallow foundations and roadways may be affected. The impacts of ponding and flooding can be reduced with appropriate engineering mitigation measures, deep foundations, and/or limiting the amount of and time of ponding or flooding within the development area.

Varying Element (ii) could result in a loss of developable land through flooding, potential construction of flood prevention berms, additional storm water conveyance systems (open channels or subsurface piping), or additional bridges to span storm water conveyance systems. A reduction in developable land may affect feasibility, cost versus value, and ability to develop.

As the final land plan and its core Elements progress, other geotechnical issues to be studied, along with their potential impacts to the proposed development, include slope stability of drainage channel banks, lake banks, and proposed slopes; the potential for lateral spreading near existing or proposed channel and lake banks; the potential for liquefaction; the potential for faulting; and the potential for landsliding near the base of the foothills to the west. Engineering mitigation measures and remedial grading or special foundation design concepts to address these issues will be developed to reduce potential impacts to within normal standards and/or to offer value engineering layout adjustments to reduce costs or ease construction.

COMPOSITE CORE PLAN - BRIEF DESCRIPTION

The current land use model presents mixed-use residential (single-family detached to high-density hi-rise structures), workplace (office space to manufacturing facilities), retail, schools (elementary to junior college), and parks (neighborhood and organized sports), along with placeholders for other community facilities such as libraries, community centers, churches, fire stations, and police substations.

The distribution of facilities is well intermixed, but in general corporate parks and manufacturing facilities are located in the north-northeast portion of CVSP; professional office space is generally in central downtown CVSP; high-density residential areas are situated near downtown CVSP progressing to lower density residential areas away from downtown CVSP; and schools and other community amenities are strategically located along main access points to support residential neighborhoods.

COMPOSITE CORE PLAN - ANALYSIS CRITERIA

Evaluation of the composite core plan includes several, variable components that were provided for our consideration. From the provided list, the following analysis criteria were incorporated, as applicable, into the geotechnical and geologic evaluation:

- Feasibility
- Cost versus Value
- Ability to Develop

EVALUATION

As requested, our discussion for the CVSP area will focus on an Environmental Footprint in which Items (i), (iii), and (iv) are constant elements, and Item (ii) is variable:

<u>Constants:</u>

(i) A spoke transit system.

(iii) A Parkway that incorporates Bailey Avenue.

(iv) A density distribution that emphasized intensification of workplace areas with structured parking; and moderate incorporation of residential hi-rise and mid-rise to allow the maximum opportunity for other family housing typologies such as town home and single family detached.

<u>Variable:</u>

(ii) Restoration of Fisher Creek to its natural flow line and a focal lake;

Item 1. An environmental footprint that avoids Fisher Creek and does not propose a lake.

Item 2. An environmental footprint that incorporates multiple small lakes and enhances Fisher Creek.

Item 3. Restoration of Fisher Creek to its natural flow line and a focal lake.

Since our preliminary geotechnical evaluation presented in the referenced document did not include subsurface exploration of field work, the information presented below is based upon published maps and other readily available information for the project area and our past experiences for projects in similar areas and complexity.

Assumptions:

Historical research, physical evidence, and recent research and analysis by Schaaf & Wheeler have confirmed that the existing Fisher Creek is not capable of carrying significant design level storm watershed without spilling over its banks. The topography of the site is relatively flat in proximity to the existing Fisher Creek alignment; therefore, we assume the surrounding area is currently a flood plain during heavy storm events, particularly the area west of Fisher Creek.

We assume Fisher Creek is intended to carry and transport pre-construction storm water entering the site and will not generally receive storm water from CVSP development. Therefore, two separate storm water systems are planned.

Variable (ii) – Item 1. An Environmental Footprint that avoids Fisher Creek and does not propose a lake.

From a geotechnical and geologic standpoint, alluvial and basin deposit soils mapped on the site, when subjected to prolonged periods of ponding, will experience reduced strength characteristics and will swell and shrink associated with seasonal wetting and drying. Improvements, such as roads and buildings, within close proximity to these areas could be impacted. Additionally, depending upon the conditions of the existing creek banks and proposed grading, impacts to the development with respect to lateral spreading and slope stability could occur. However, with standard engineering practices, creek setbacks, and site-specific remedial grading, this option is geotechnically feasible.

For this scenario, to improve the geotechnical performance of the soils supporting roads and buildings, it would be beneficial to control the area of flooding/ponding associated with avoidance of Fisher Creek. This could be accomplished in a variety of ways such as:

- Raising grades along the impacted valley areas to prevent impact from flooding, such as to elevations exceeding the 100-year flood level and allow Fisher Creek to overflow. Although raising grades in the valley area are likely to create drainable building pads, additional finished grade increases may be required to reach 100-year flood level elevations. The height of the graded slope above the existing banks of Fisher Creek may encroach into current development areas.

For the existing Composite Core Plan, Constant (i) and (iii) are unaffected, Constant (iv) may be affected depending upon the engineered berm dimensions.

- Raising finished grades to elevations exceeding the 100-year flood level could be focused along, but just beyond, the banks of the existing Fisher Creek through construction of an engineered berm system designed to contain 100-year storm events within the banks of the creek. The width of the engineered berm may encroach into current development areas.

  For the existing Composite Core Plan, Constant (i) is unaffected, and Constants (iii) and (iv) may be affected depending upon the engineered berm dimensions. A longer bridge on Bailey Avenue over Fisher Creek may be needed.

- Diverting storm water volumes that exceed the carrying capacity of the existing Fisher Creek into new channel systems.

  For the existing Composite Core Plan, Constant (i) is unaffected, Constants (iii) and (iv) may be affected depending upon number of channels and additional bridges on Bailey Avenue associated with additional drainage channels.

- Minimal earthwork approach of constructing deep cut off subdrain systems along the edges of development (roads and buildings) bordering Fisher Creek to collect and rapidly transport subsurface water to approved outlet locations. Cut-off subdrains will help control saturation of soils supporting roads and structures supported on shallow foundation systems. Additional interior subdrain systems may also be necessary, as well as raising finished floor elevations of buildings, as a minimum, to above anticipated flood levels. Affected roads and other common areas may remain subjected to flooding.

  For the existing Composite Core Plan, Constants (i) and (iii) are likely affected during peak storm event flooding, and Constant (iv) would be unaffected provided finished floor elevations are above 100-year flood levels.

- Selective site grading to place low expansive fill materials below buildings supported on shallow foundations to minimize shrink-swell potential associated with wetting and drying of the foundation materials. Raising finished floor elevations of buildings, as a minimum, to above anticipated flood levels would be anticipated. Affected roads and other common areas may remain subjected to flooding.

  For the existing Composite Core Plan, Constants (i) and (iii) are likely affected during peak storm event flooding, and Constant (iv) would be unaffected provided finished floor elevations are above 100-year flood levels.

We understand the lake amenity to be a focal point of the CVSP development and a core component for drawing people and industry. The potential marketing/revenue losses by removing the lake feature is not a geotechnical consideration. From a geotechnical perspective, there is no impact with removing the lake feature; however, the lake will create a readily available source of borrow fill for the overall CVSP area, which as a minimum is an earthwork benefit (reduction in import and associated costs).

Constants (i), (iii), and (iv) could be affected.

Characterizing and remediating existing and proposed development areas that exhibit potential impacts of slope instability, lateral spreading, and soil saturation will be necessary, but are not considered unique to this scenario. Site specific exploration, design, analysis, and remedial recommendations would be provided to improve the conditions or avoid select areas if cost or regulatory prohibitive. Remedial measures may include construction of subdrained keyways, cut-off subdrains, possible channel liners, and localized subexcavation and ground improvement techniques, as applicable.

<u>Variable (ii) – Item 2.</u> An Environmental Footprint that incorporates multiple small lakes and enhances Fisher Creek.

We assume that enhancing the existing Fisher Creek may not greatly increase the existing storm flow carrying capacity; therefore, we envision small detached lakes dispersed within and around the core development area, many of which will likely be connected into the enhanced Fisher Creek to increase the existing storm flow capacity.

Similar to Variable (ii) - Item 1 above, alluvial and basin deposit soils mapped on the site, when subjected to prolonged periods of ponding, will experience reduced strength characteristics and will swell and shrink associated with seasonal wetting and drying. Improvements, such as roads and buildings, within close proximity to these areas could be impacted. Additionally, depending upon the limitations of enhancing the existing creek banks and the proximity of the proposed improvements to the creek bank, impacts to the roads and buildings with respect to lateral spreading, slope stability, and soil saturation could occur. However, with standard engineering practices, design, creek setbacks, and site-specific remedial grading, this option is geotechnically feasible.

From a geotechnical standpoint, controlling the area of flooding/ponding associated with enhancement of Fisher Creek and construction of small lakes is important for maintaining the performance of foundation soils. The bulleted items discussed in Item 1 remain applicable, possibly to a lesser degree, based upon the type of creek bank enhancement, and are reiterated:

- Raising grades along the impacted valley areas to prevent impact from flooding, such as to elevations exceeding the 100-year flood level and allow Fisher Creek to overflow. Although raising grades in the valley area are likely to create drainable building pads, additional finished grade increases may be required to reach 100-year flood level elevations. The height of the graded slope above the existing banks of Fisher Creek may encroach into current development areas.

For the existing Composite Core Plan, Constants (i) and (iii) are unaffected, Constant (iv) may be affected depending upon the engineered berm dimensions.

- Raising finished grades to elevations exceeding the 100-year flood level could be focused along, but just beyond, the banks of the existing/enhanced Fisher Creek through construction of an engineered berm system designed to contain 100-year storm events within the banks of the creek. The width of the engineered berm may encroach into current development areas.

  For the existing Composite Core Plan, Constant (i) is unaffected, and Constants (iii) and (iv) may be affected depending upon the engineered berm dimensions. A longer bridge on Bailey Avenue over Fisher Creek may be needed.

- Diverting storm water volumes that exceed the carrying capacity of the existing/enhanced Fisher Creek into new channel systems and small lakes.

  For the existing Composite Core Plan, Constant (i) is unaffected, Constants (iii) and (iv)may be affected depending upon number of lakes, channels and additional bridges on Bailey Avenue associated with additional drainage channels.

- Minimal earthwork approach of constructing deep cut off subdrain systems along the edges of development (roads and buildings) bordering Fisher Creek to collect and rapidly transport subsurface water to approved outlet locations. Cut-off subdrains will help control saturation of soils supporting roads and structures supported on shallow foundation systems. Additional interior subdrain systems may also be necessary, as well as raising finished floor elevations of buildings, as a minimum, to above anticipated flood levels. Affected roads and other common areas may remain subjected to flooding.

  For the existing Composite Core Plan, Constants (i) and (iii) are likely affected during peak storm event flooding, Constant (iv) would be unaffected provided finished floor elevations are above 100-year flood levels.

- Selective site grading to place low expansive fill materials below buildings supported on shallow foundations to minimize shrink-swell potential associated with wetting and drying of the foundation materials. Raising finished floor elevations of buildings, as a minimum, to above anticipated flood levels would be anticipated. Affected roads and other common areas may remain subjected to flooding.

  For the existing Composite Core Plan, Constants (i) and (iii) are likely affected during peak storm event flooding, Constant (iv) would be unaffected provided finished floor elevations are above 100-year flood levels.

Construction of small lakes will create a readily available source of borrow fill for the overall CVSP area, which is an earthwork benefit (reduction in import, select grading, and associated costs). Depending upon the needs to keep the lakes full or partially full year-round, design and construction of the lakes should consider the soil type. Due to the alluvial/basin deposit soil conditions (silty/clayey sands), the soils are expected to be relatively porous, allowing storm water to infiltrate through the base and sides of the lake unless treated (manufactured liner, admixture, engineered clay liner). Additionally, the holding capacity of naturally-lined lakes could possibly vary during the winter months due to increasing levels of groundwater, which will slow the rate of infiltration. Dewatering may be necessary for deeper lakes requiring less acreage impact than shallower lakes.

> ***For the existing Composite Core Plan, Constants (i), (iii), and (iv) could be affected.***

Variable (ii) – Item 3. Restoration of Fisher Creek to its natural flow line and a focal lake (Core Plan).

The current core plan shows Fisher Creek restored generally into its natural flow line and discharged into Laguna Seca at the north end of the project. The lake amenity is proposed near the center of the downtown area to serve as a focal point for the overall CVSP project. The lake also appears to be the outfall point for treated development storm water drainages (piped and hard surfaced open channels), and handles storm events that overwhelm the restored Fisher Creek via a downstream overland release area. An upstream bypass channel from Fisher Creek into the development drainage channel is also identified.

Similar to Variable (ii) - Items 1 and 2 above, alluvial and basin deposit soils mapped on the site, when subjected to prolonged periods of ponding, will experience reduced strength characteristics and will swell and shrink associated with seasonal wetting and drying. Improvements, such as roads and buildings, within close proximity to these areas could be impacted. Additionally, depending upon the proximity of the proposed improvements to unlined creek and lake banks, impacts to the development with respect to lateral spreading, slope stability, and soil saturation could occur. However, with standard engineering practices, setbacks, and site-specific remedial grading, this option is geotechnically feasible.

> ***For the existing Composite Core Plan, Constants (i), (iii), and (iv) should be unaffected.***

The performance of soils in the development area are improved by controlling flooding/ponding associated with restoring Fisher Creek and construction of the focal lake. For the restored Fisher Creek and focal lake construction, we anticipate that raising finished grades within the development area to exceed the 100-year flood elevations is possible. This will minimize ponding and saturation of foundation soils. Depending upon the layout and proximity of the creek, drainage channels, and focal lake to residential development, deep cut off subdrain systems may be beneficial along the edges of development (roads and buildings) bordering/below the water features to collect and rapidly transport water to approved outlet locations. As noted in Item 1, cut-off subdrains will help control saturation of soils supporting roads and structures supported on shallow foundation systems.

> ***For the existing Composite Core Plan, Constants (i), (iii), and (iv) should be unaffected.***

As noted in Variable (ii) - Item 1, we understand the lake amenity to be a focal point of the CVSP development and a core component for drawing people and industry. From a geotechnical perspective, the lake will create a readily available source of borrow fill for the overall CVSP area, which is a drainage benefit, a flood zone benefit, and a general earthwork benefit (reduction in import and associated costs). Design and construction of the lake should consider the anticipated soil conditions forming the base and sides of the lake (alluvial/basin deposits), the seasonal variation in groundwater levels, and the intended lake usage and size. Based upon discussion, the lake will be used for recreational uses including swimming and boating (small motorized and non-motorized) and, therefore, it is desired to maintain a fixed water level year round. Based upon our research, the soil deposits at the lake area are expected to be silty clays overlying silty/clayey sands which are generally permeable. According to published maps and irrigation well information obtained by Schaaf & Wheeler, the groundwater elevations fluctuate seasonally from near the existing surface to roughly 35 feet below the existing surface. As a result, the lake should not be expected to maintain a constant water level unless lined (manufactured liner or import clay soil), amended with chemicals or products mixed into the site soil, or unless water was continuously pumped into the lake. A manufactured liner may be the preferred alternative to accommodate seasonal groundwater levels and potential dewatering activities during construction.

For the existing Composite Core Plan, Constants (i), (iii), and (iv) should be unaffected.

CLOSING

We hope this provides useful information. If you have any questions regarding the contents of this letter, please do not hesitate to contact us.

Very truly yours,

ENGEO INCORPORATED

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Reviewed by:

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